FIG. 1

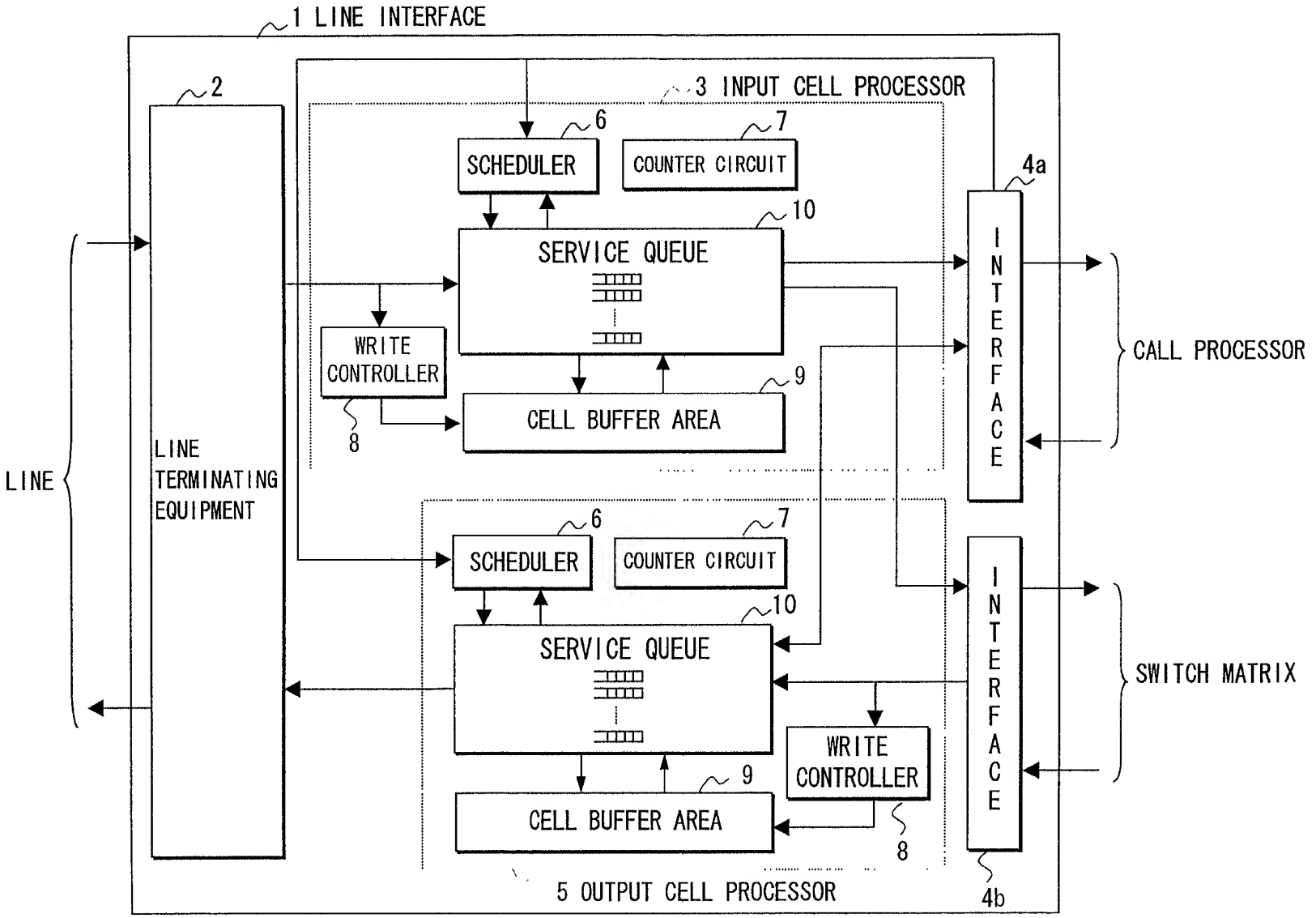
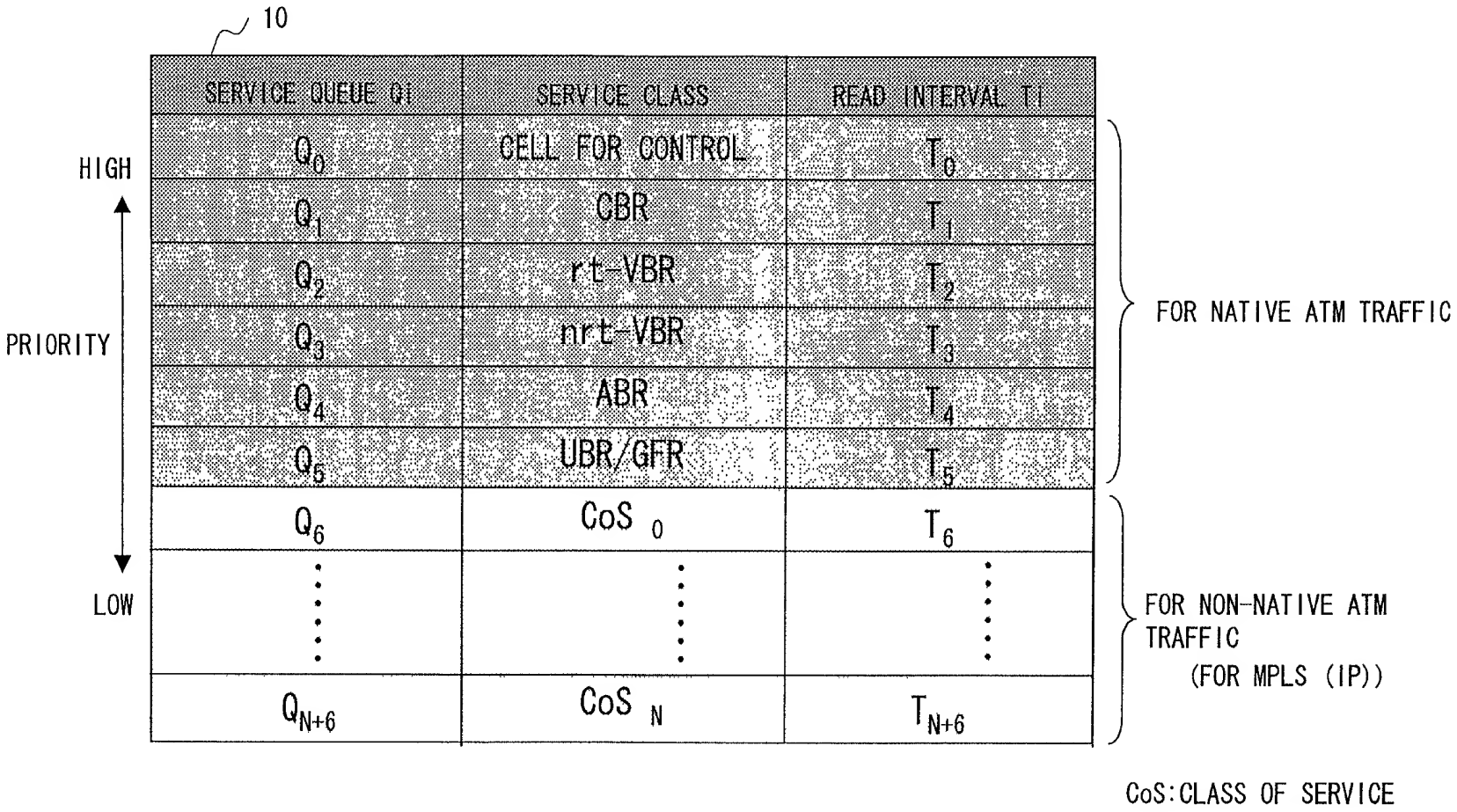

1 LINE INTERFACE
2
3 INPUT CELL PROCESSOR
6
SCHEDULER
7
COUNTER CIRCUIT
4a
10
SERVICE QUEUE
WRITE CONTROLLER
8
9
CELL BUFFER AREA
INTERFACE
CALL PROCESSOR
LINE
LINE TERMINATING EQUIPMENT
6
SCHEDULER
7
COUNTER CIRCUIT
10
SERVICE QUEUE
INTERFACE
SWITCH MATRIX
WRITE CONTROLLER
9
CELL BUFFER AREA
8
5 OUTPUT CELL PROCESSOR
4b

FIG. 2


10
SERVICE QUEUE Qi
SERVICE CLASS
READ INTERVAL TI
HIGH
PRIORITY
LOW
Q0
CELL FOR CONTROL
T0
Q1
CBR
T1
Q2
rt-VBR
T2
Q3
nrt-VBR
T3
Q4
ABR
T4
Q5
UBR/GFR
T5
Q6
CoS 0
T6
QN+6
CoS N
TN+6
FOR NATIVE ATM TRAFFIC
FOR NON-NATIVE ATM TRAFFIC
(FOR MPLS (IP))
CoS:CLASS OF SERVICE

FG 66③

FIG. 3

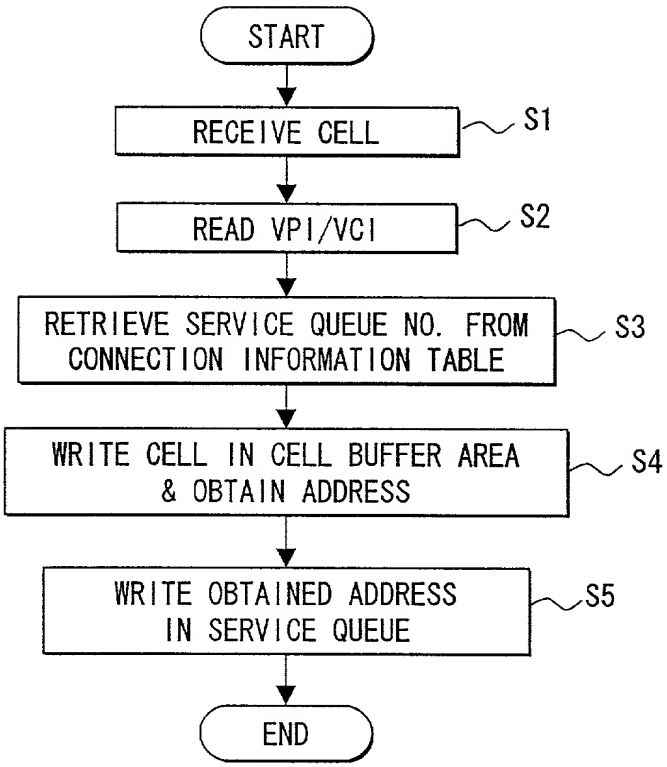
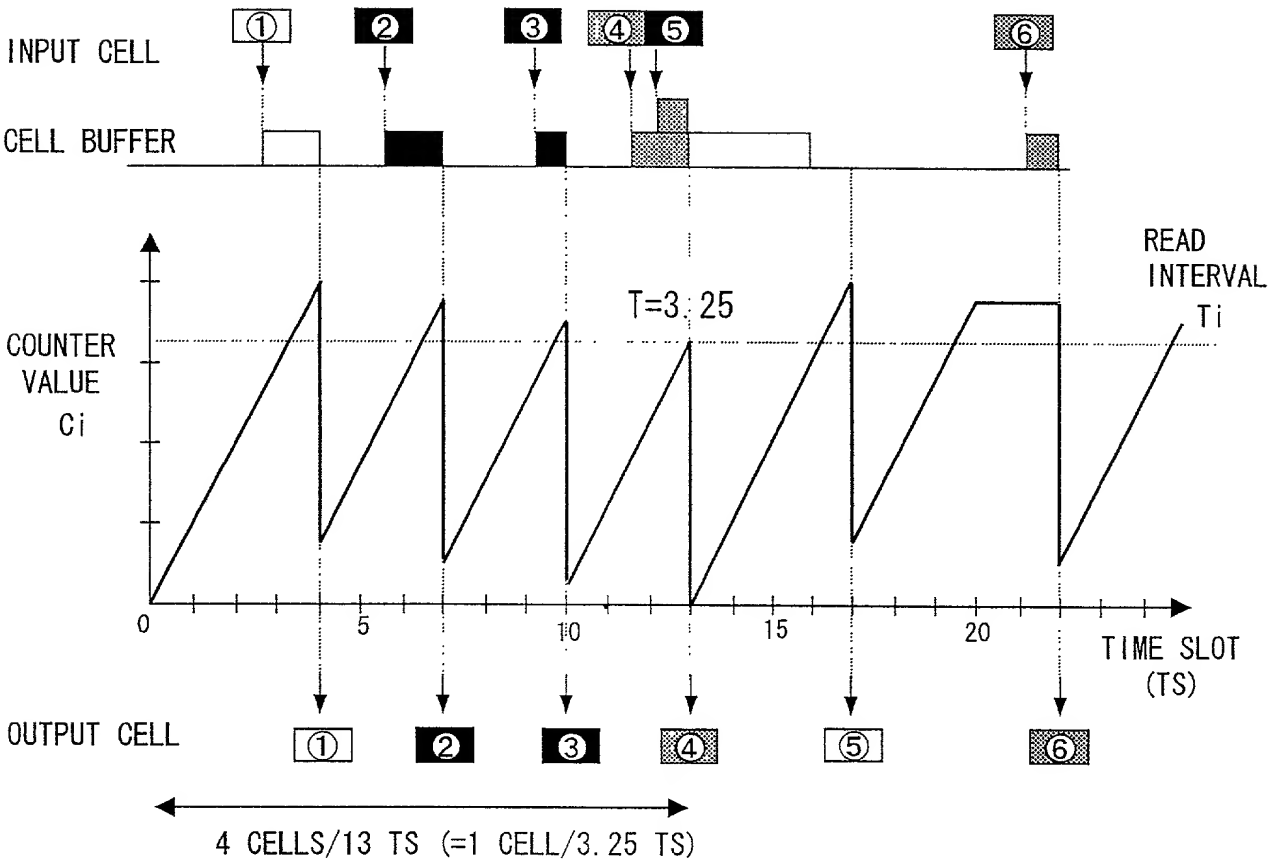


FIG. 4

ENTRY NO.	VPI	VCI	SERVICE QUEUE NO.
0	15	13	Q_4
1	21	19	Q_6
⋮	⋮	⋮	⋮

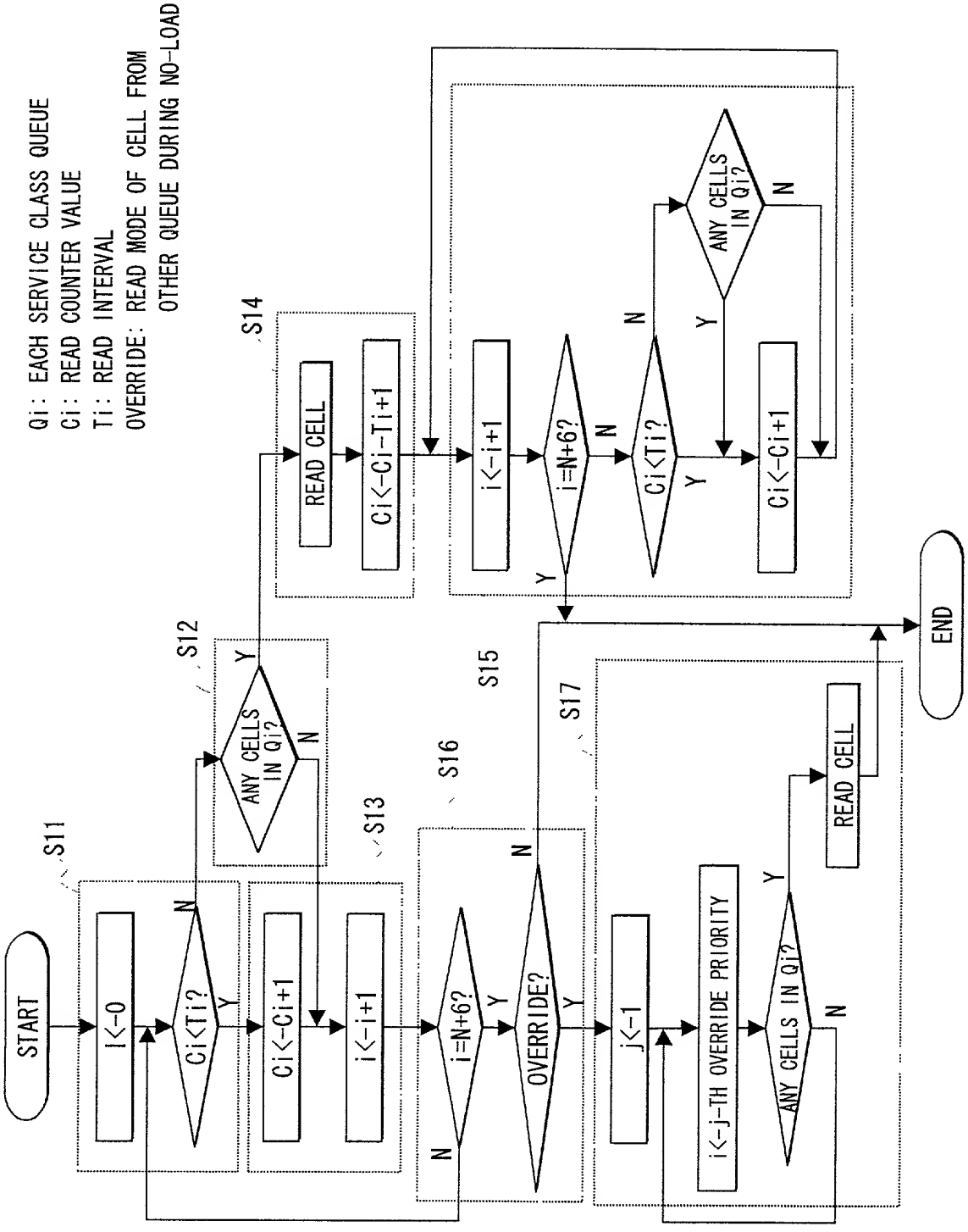
FG 66(4)

FIG. 5


INPUT CELL
CELL BUFFER
READ INTERVAL Ti
T=3.25
COUNTER VALUE Ci
0
5
10
15
20
TIME SLOT (TS)
OUTPUT CELL
4 CELLS/13 TS (=1 CELL/3.25 TS)

FG 6(5)

FIG. 6


Qi: EACH SERVICE CLASS QUEUE
Ci: READ COUNTER VALUE
Ti: READ INTERVAL
OVERRIDE: READ MODE OF CELL FROM OTHER QUEUE DURING NO-LOAD
START
S11
i<-0
Ci<Ti?
Ci<-Ci+1
i<-i+1
S12
ANY CELLS IN Qi?
S13
i=N+6?
S14
READ CELL
Ci<-Ci-Ti+1
S15
i<-i+1
i=N+6?
Ci<Ti?
ANY CELLS IN Qi?
Ci<-Ci+1
S16
OVERRIDE?
S17
j<-1
i<-j-TH OVERRIDE PRIORITY
ANY CELLS IN Qi?
READ CELL
END

FG 66 (6)

FIG. 7

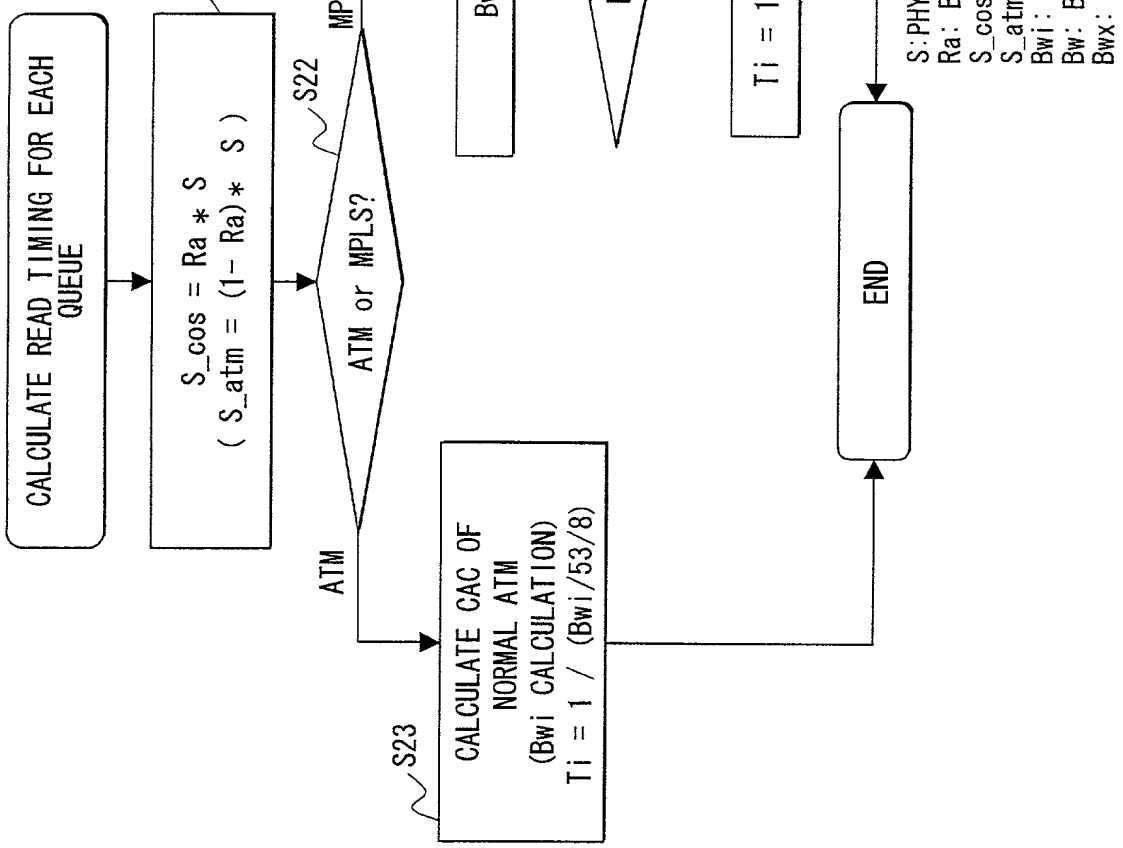

CALCULATE READ TIMING FOR EACH QUEUE
S21
S_cos = Ra * S
(S_atm = (1- Ra)* S)
S22
ATM or MPLS?
MPLS
ATM
S24
Bw = Bw + Bwx
S25
Bw > S_cos?
Y
N
S26
REJECT NEW CONNECTION ADMISSION
S27
Ti = 1 / (S_cos/53/8)
S23
CALCULATE CAC OF NORMAL ATM (Bwi CALCULATION) Ti = 1 / (Bwi/53/8)
END
S:PHYSICAL LINK BANDWIDTH
Ra: BANDWIDTH ALLOCATION RATE FOR MPLS
S_cos: BANDWIDTH FOR MPLS
S_atm: BANDWIDTH FOR ATM SERVICE
Bwi: READ BANDWIDTH FROM EACH SERVICE QUEUE
Bw: BANDWIDTH DEMANDED BY EACH CONNECTION OF MPLS
Bwx: BANDWIDTH DEMANDED BY NEWLY ADMITTING CONNECTION

FIG. 8

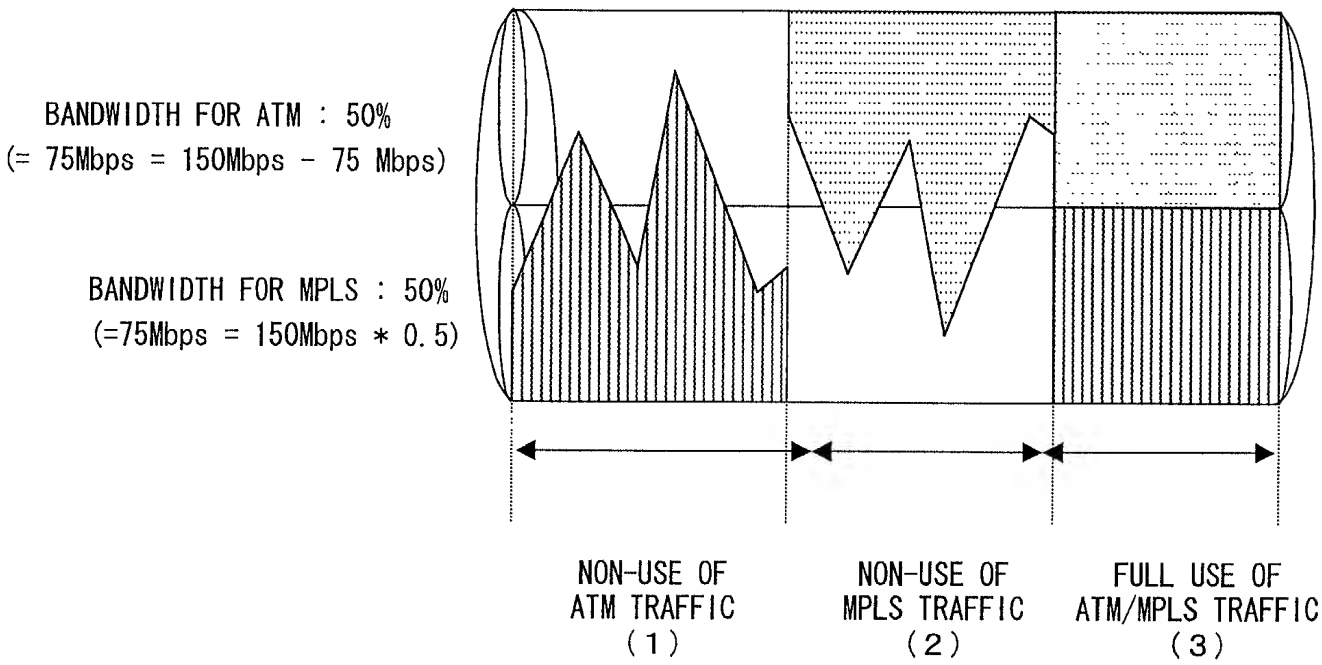
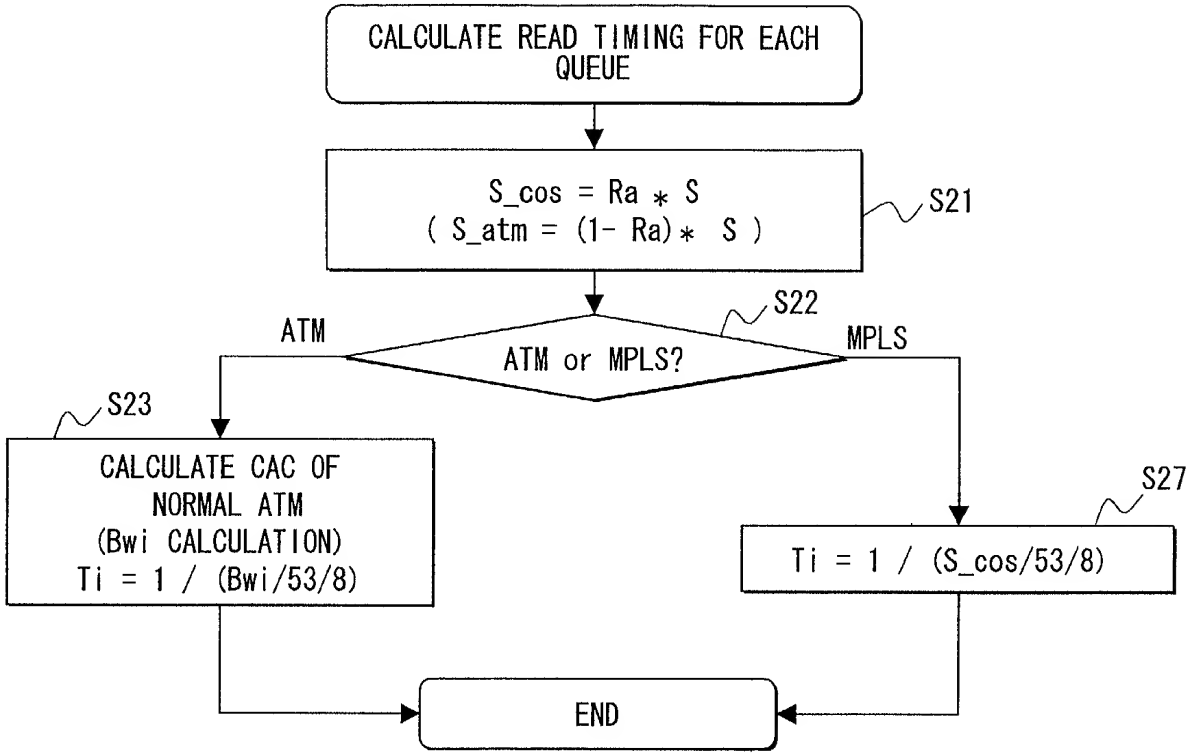
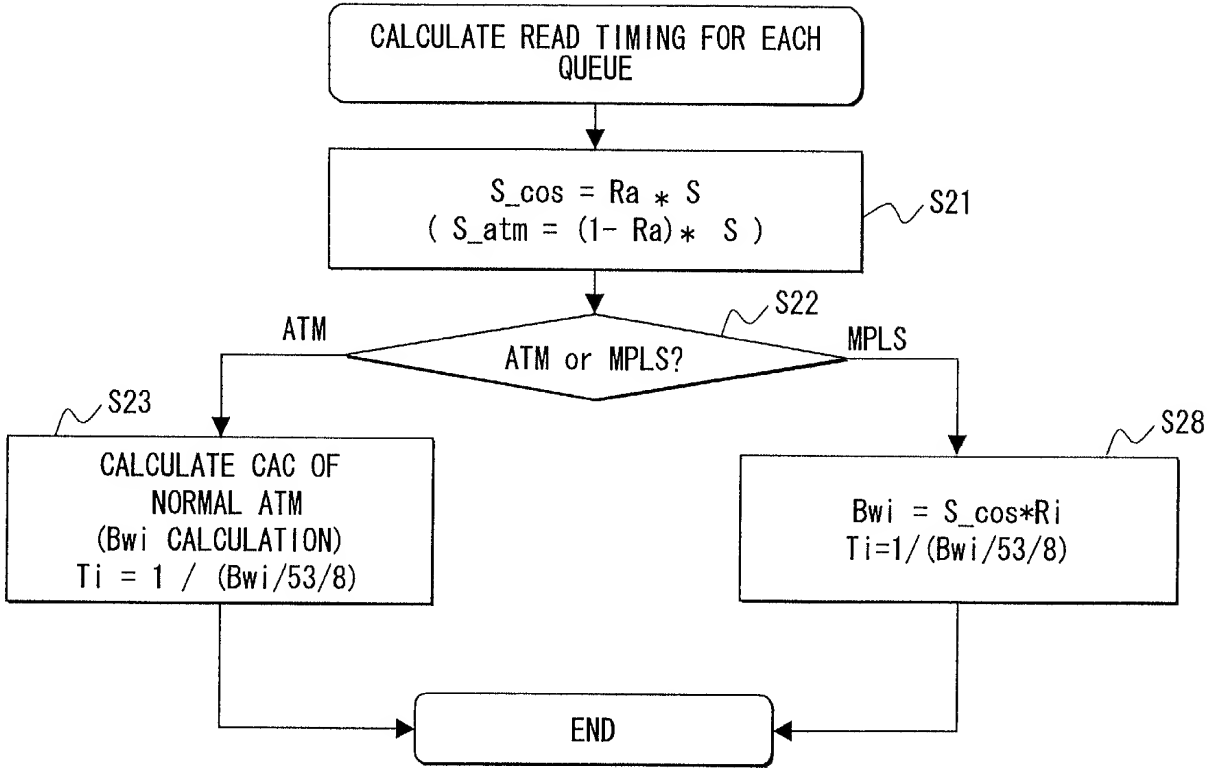

BANDWIDTH FOR ATM : 50%
(= 75Mbps = 150Mbps - 75 Mbps)
BANDWIDTH FOR MPLS : 50%
(=75Mbps = 150Mbps * 0.5)
NON-USE OF ATM TRAFFIC (1)
NON-USE OF MPLS TRAFFIC (2)
FULL USE OF ATM/MPLS TRAFFIC (3)

FIG. 9



S:PHYSICAL LINK BANDWIDTH
Ra: BANDWIDTH ALLOCATION RATE FOR MPLS
S_cos: BANDWIDTH FOR MPLS
S_atm: BANDWIDTH FOR ATM SERVICE
Bwi: READ BANDWIDTH FROM EACH SERVICE QUEUE
Bw: BANDWIDTH DEMANDED BY EACH CONNECTION OF MPLS
Bwx: BANDWIDTH DEMANDED BY NEWLY ADMITTING CONNECTION

FIG. 10



S:PHYSICAL LINK BANDWIDTH
Ra: BANDWIDTH ALLOCATION RATE FOR MPLS
S_cos: BANDWIDTH FOR MPLS
S_atm: BANDWIDTH FOR ATM SERVICE
Bwi: READ BANDWIDTH FROM EACH SERVICE QUEUE
Ri: BANDWIDTH ALLOCATION RATE FOR PRIORITY i

FG66(10)

FIG. 11

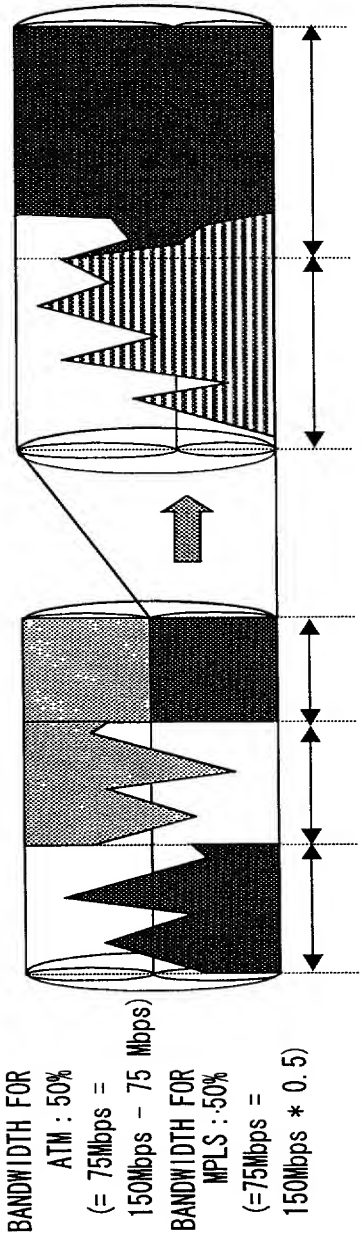
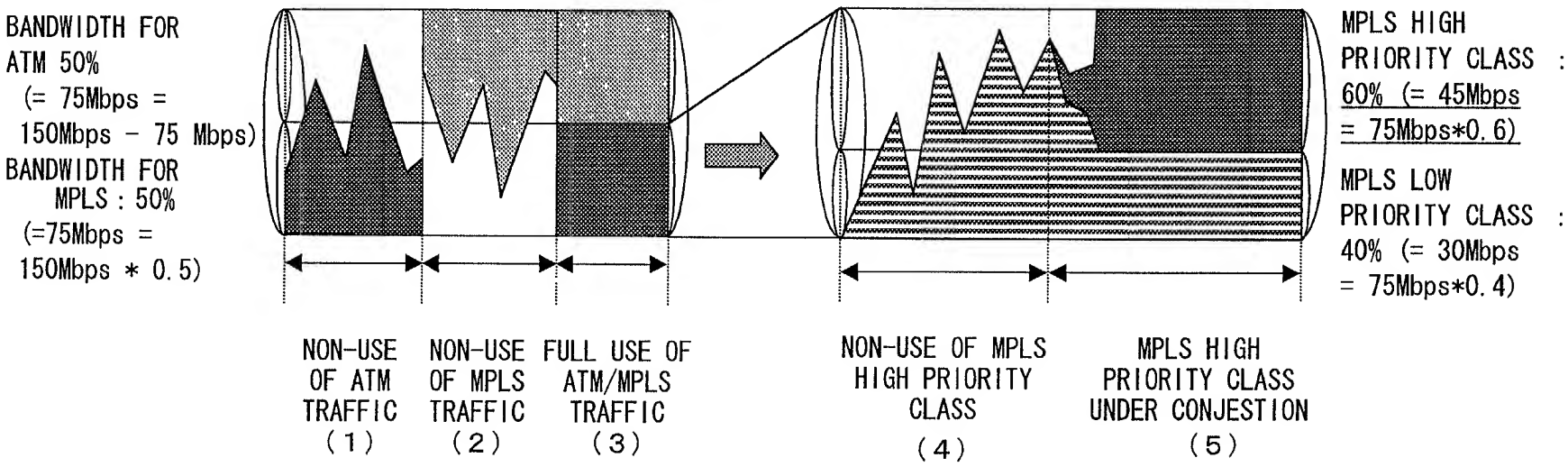
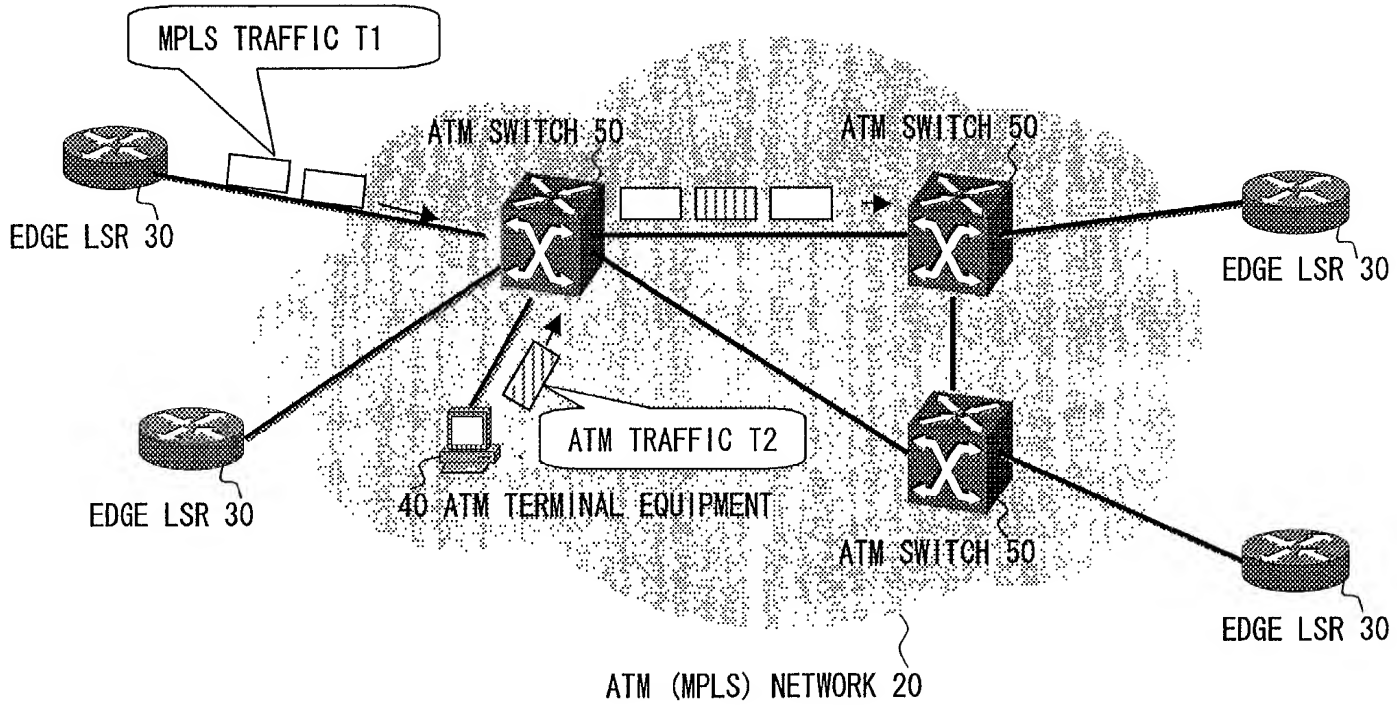


FIG. 12


BANDWIDTH FOR ATM 50% (= 75Mbps = 150Mbps - 75 Mbps)
BANDWIDTH FOR MPLS : 50% (=75Mbps = 150Mbps * 0.5)
MPLS HIGH PRIORITY CLASS : 60% (= 45Mbps = 75Mbps*0.6)
MPLS LOW PRIORITY CLASS : 40% (= 30Mbps = 75Mbps*0.4)
NON-USE OF ATM TRAFFIC (1)
NON-USE OF MPLS TRAFFIC (2)
FULL USE OF ATM/MPLS TRAFFIC (3)
NON-USE OF MPLS HIGH PRIORITY CLASS (4)
MPLS HIGH PRIORITY CLASS UNDER CONJESTION (5)



LSR: LABEL SWITCHING ROUTER

FIG. 14

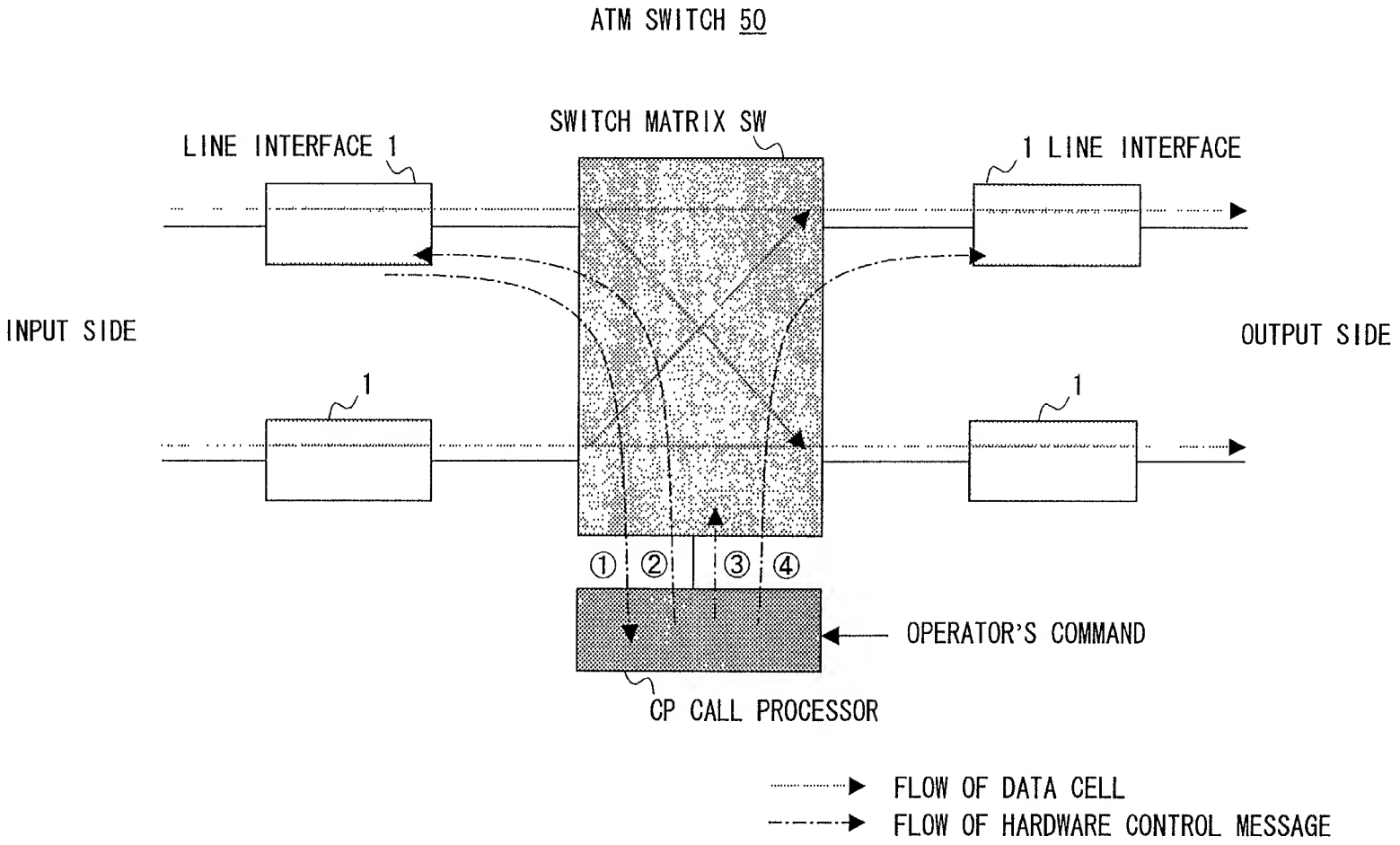
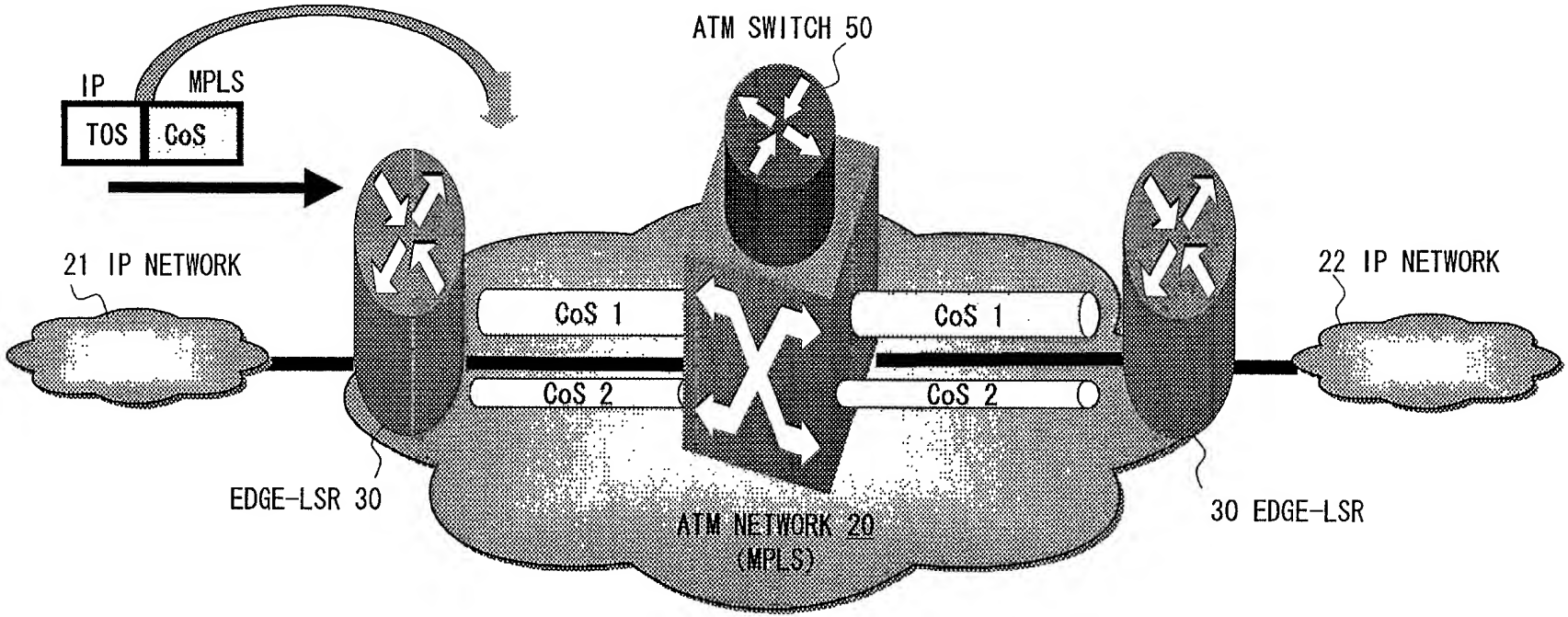

ATM SWITCH 50
SWITCH MATRIX SW
LINE INTERFACE 1
1 LINE INTERFACE
INPUT SIDE
OUTPUT SIDE
1
1
① ② ③ ④
OPERATOR'S COMMAND
CP CALL PROCESSOR
FLOW OF DATA CELL
FLOW OF HARDWARE CONTROL MESSAGE

FIG. 15


ATM SWITCH 50
IP
MPLS
TOS
CoS
21 IP NETWORK
22 IP NETWORK
CoS 1
CoS 2
CoS 1
CoS 2
EDGE-LSR 30
30 EDGE-LSR
ATM NETWORK 20
(MPLS)